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PATENT
2565-0136P

IN THE U.S. PATENT AND TRADEMARK OFFICE

Applicant:	Shusou WADAKA, et al.	Conf.:	2419
Appl. No.:	09/202,070	Group:	2834
Filed:	December 8, 1998	Examiner:	M. BUDD

For: FILM ACOUSTIC WAVE DEVICE AND ITS MANUFACTURING METHOD AND CIRCUIT DEVICE

LETTER

Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

July 25, 2003

Sir:

An Information Disclosure Statement was filed on December 8, 1998 with which a copy of JP HEI 1-231411. An English language Search Report and English language Abstract were also filed.

However, at this time, Applicants hereby submit a partial English translation JP HEI 1-231411.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Chad J. Billings (Reg. No. 48,917) at the telephone number of the undersigned below.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit

Account No. 02-2448 for any additional fees required under 37 C.F.R. § 1.16 or under 37 C.F.R. § 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By _____
Michael R. Cammarata
Reg. No. 39,491

P.O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000

MRC/CJB:cb
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Attachment: Partial English Translation of JP HEI 1-231411

Partial Translation

Japanese Unexamined Patent Application Publication JP HEI 1-231411

(Embodiment.)

With reference to drawings, an embodiment of this invention is explained below in details.

Fig. 1 is a plan view for explaining a manufacturing method of a surface acoustic wave resonator filter in an embodiment of this invention. In this figure, 11 denotes a piezoelectric wafer on a surface of which a plurality of electrode patterns 13 (hereinafter called sub-electrode patterns) of the surface acoustic wave device for measuring frequency characteristics in an area illustrated with slash lines in the figure as well as a plurality of electrode patterns 12 (hereinafter called main electrode patterns) of the surface acoustic wave resonator filter are arranged.

Each of the electrode patterns 12 and 13 on this piezoelectric wafer 11 is formed by a regular photo-etching operation after forming a metal film, e.g., Al film, etc. in a determined thickness by a vaporing method, a sputtering method, etc. As illustrated in Fig. 2, each of the electrode patterns 12 and 13 includes a pair 14 of comb-shaped electrodes for outputting, a pair 15 of comb-shaped electrodes for inputting, and two grating reflectors 16 and 17 provided in a prescribed location at both sides of these pairs 14 and 15 of com-shaped electrodes.

Fig. 3 and Fig. 4 illustrate frequency characteristics of the main electrode pattern 12 and the sub-electrode pattern 13 stated-above respectively.

As know from these figures, in the sub-electrode pattern 13, a pattern size, e.g., its electrode pitch, number, etc. is designed to make its passage bandwidth narrower than passage bandwidth of the main electrode pattern 12. Further, in

this embodiment, the sub-electrode pattern 13 is formed by setting its input and output impedance high so that its central frequency is almost equal to each of the electrode patterns 12 and 13.

In this embodiment, as stated, quality concerning the frequency characteristic of the main electrode pattern 12 can be judged with higher accuracy of measurement by measuring the frequency of the sub-electrode pattern 13 using a prober after each of the electrode patterns 12 and 13 is formed on the piezoelectric wafer 11.

In this case, it is not necessary that the input and output impedance between the main electrode pattern 12 and the prober is matched.

As stated, in the manufacturing method of the surface acoustic wave resonator filter according to this embodiment, the accuracy of measurement of the frequency characteristics is improved by measuring the frequency of the sub-electrode pattern 13 by patterning the sub-electrode pattern 13 in a narrow band for measuring the frequency on the identical piezoelectric wafer 11 besides the main electrode pattern 12 of the surface acoustic wave resonator filter. Further, the quality of the piezoelectric wafer 11 can become judged easily and also effectively after the electrode patter is formed. Since a number of defective goods among the piezoelectric wafers 11 advancing to later steps can be reduced, the cost can be lowered.

Further, even if the main electrode pattern 12 includes a multiplicity of wiring units for inputting from and outputting to an outside and these wiring units for inputting and outputting operate by being connected complicatedly, there is an advantage that a configuration of the prober can become simple by forming the sub-electrode pattern 13 in a simple pattern.

In this embodiment, the pattern of the surface acoustic wave resonator filter in a form of a pair of two terminals was formed as the sub-electrode pattern 13. However, it is also possible that a pattern of the surface acoustic wave resonator filter in a form of one terminal is formed.